



MIRION
TECHNOLOGIES

USER MANUAL

RDS-Med™ Survey Meter

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ATTENTION

The RDS-Med Radiation Survey Meter does not contain any hazardous or dangerous substances and can be recycled accordingly. The batteries of the device must be recycled separately as instructed by the manufacturer of the batteries.

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1 INTRODUCTION

The RDS-Med Radiation Survey Meter offers precise monitoring of ionizing radiation, ensuring the safety of medical professionals and patients. Versatile and user-friendly, the RDS-Med survey meter is ideal for healthcare applications such as radioisotope production, radiopharmacies, nuclear medicine, diagnostic imaging, hot labs, and waste disposal. Designed to meet stringent health and safety standards, the RDS-Med survey meter is crucial for medical environments using radiation in diagnosis and treatment.

A clear display and straightforward user interface enable quick assessment of radiation level. Ergonomic, lightweight design, and an included battery cover with belt clip make the meter workflow-friendly.

The RDS-Med meter can detect a wide range of ionizing radiation, including gamma and X-rays, with the ability to connect to external alpha, beta, and neutron probes. Mirion GMP-12/GMP-25 probes and the full CSP™ probe range can be connected with an adequate cable.

With both warning and alarm levels, users can know quickly if contamination or dose rates exceed screening levels for decontamination or patient monitoring.

RDS-MED VERSIONS AND ORDERING CODES

Part no. 1233-343 RDS-Med S Radiation Survey Meter

Part no. 1233-344 RDS-Med R Radiation Survey Meter

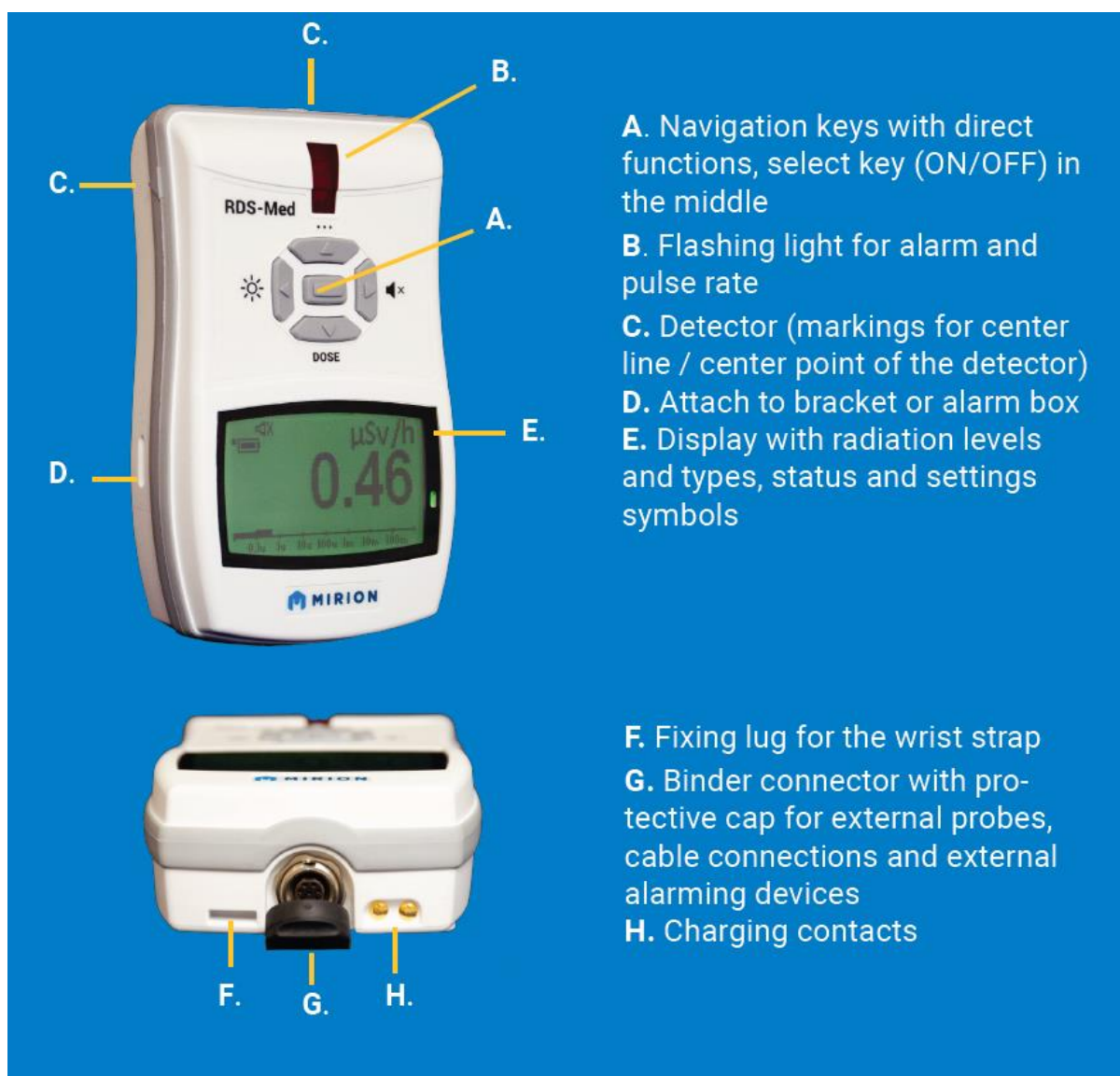


**The RDS-Med is part of the Mirion Technologies RDS-32 survey meter family.
Visit [mirion.com](https://www.mirion.com) to learn more!**

2 GETTING STARTED

2.1 OVERVIEW OF THE METER

The RDS-Med is lightweight and is ergonomically designed for handheld use. Navigation keys are placed above the large display, and the rubber grip around the meter enables handling in all conditions. Enclosure class is IP67, including battery compartment. For performance characteristics, check the RDS-Med specification from Chapter 6.



The detector position is indicated with markings on the meter. The triangles on the meter sides indicate the reference line and the dot on the back of the meter indicates the GM-tube center point.

2.2 INSERTING BATTERIES

The instrument uses two IEC (LR6/ HR6) AA-size batteries.

Open the battery compartment using a Pozidriv #1 screwdriver. RDS-Med is delivered with two battery covers. One of the covers has belt clip attached to it. Observe the correct polarity of the batteries.

Alkaline or lithium batteries can be used. Battery monitoring is accurate for alkaline batteries. Lithium batteries are recommended for use with CSP probes. Rechargeable NiMH batteries can also be used. When using NiMH batteries, the CSW-Med Configuration software is required to select the correct battery type for battery charging and monitoring.

USB-RDS Cable Link (Part no. 1233-333) can be used to charge NiMH batteries (power supply max. output power 15 W). Cradle for RDS (Part no. 1241-251) includes power supply and a wall mounting kit. The cradle can be mounted to wall using the screws provided in the kit and it is also compatible with most camera mounts.

WARNING! Risk of explosion if the battery is replaced with an incorrect type of battery.

WARNING! Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.

WARNING! Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.

2.3 POWER ON

POWER ON the device by pressing the Select key for two seconds.

The firmware version, time and calibration status are first shown on the display. If the time of meter's Real Time Clock is not set, the flashing 'TIME NOT SET' message is displayed. If necessary, the Real Time Clock can be reset with the CSW-Med Configuration Software.

When switched on the meter performs the following self-test functions:

- All the display pixels are turned on
- The buzzer is activated
- The vibration is activated
- The display backlight is switched on
- The battery condition is tested
- The HV-generator is tested

After the initialization phase is complete, the Main display with dose rate will be shown.

2.4 POWER OFF

POWER OFF the device by first pressing the Select key so that the OFF selection is activated. Press the Select key again and hold for four seconds while the counter counts down.



If the select key is released before the countdown is complete, the device will return to the menu display.

2.5 MAIN DISPLAY

After initialization phase the Main display with dose rate will be shown. The symbols visible on the Main display depend on the status of meter. The display symbols are presented in the following chapter.



The two example Main displays above show the measured dose rate, Sv unit with multiplier, battery capacity, analog dose rate indicator and different states of audio setting: chirp enabled (left), chirp disabled and key sounds disabled (right).

The basic instrument RDS-Med has two units: Sv-based and rem-based. A suitable sub-multiplier 'µ' or 'm' is set to extend the display range. In addition, '/h' is applied to indicate the dose rate.

With external gamma dose rate probes, the same basic units can be used (Sv/h, Sv, rem/h and rem). With other external probes, the display can be configured to units cps, cpm, dpm, Bq or Bq/cm². Which units are available will vary by probe type. The external probe unit in use is indicated above the reading.

When using external probes, the RDS-Med also displays the dose rate from the internal detector of the instrument and integrates accumulated dose. The RDS-Med internal detector dose rate is displayed on the bottom left corner of the Main display. The dose rate and dose alarms/warnings set for the RDS-Med detector are operational.



Example of the Main display with external dose rate probe connected.

















Example of the Main display with alpha/beta probe connected.

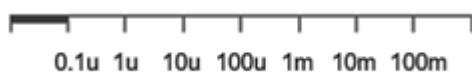
2.6 DISPLAY SYMBOLS

The RDS-Med Main display features a host of symbols relating to the current status or active setting of the meter.

DISPLAY SYMBOLS AND THE RELATED FUNCTIONS:

Display symbols for audio and alarming functions			
	Key and alarm buzzer enabled		Audible chirp enabled
	Key buzzer disabled, alarm buzzer enabled		All audible muted except alarm/warning
	Key buzzer enabled, alarm buzzer disabled		Vibration alarm is enabled
	Button and alarm buzzer disabled	AL	Alarm condition exists
		W	Warning condition exists
NOTE: If speaker and chirp symbols are not visible, the device is muted. Some of the above settings are only available in the CSW-Med Configuration Software.			

Display symbols for external detectors			
 CSP.INIT	Waiting for external detector connection	EXT	External detector is connected
A	Alpha detector measuring	β	Beta detector measuring
Γ	Gamma detector measuring (and internal detector measurement)	n	Neutron detector measuring
Display symbols for battery status			
	Battery full		50% capacity (changes showed in steps of 10%)
	Powered from USB or cradle. Alternates with battery capacity symbol in two second intervals.		Life indicator blinks on the left side of battery symbol
NOTE: Battery monitoring is accurate for alkaline batteries. Configuration software is needed to setup use of rechargeable NiMH batteries.			
Display symbols for communication			
	Bluetooth		WRM transmission active



The analog bar is shown at the bottom of the Main display.

2.7 KEYPAD USE



The RDS-Med features a Select key in the middle of the keypad and four surrounding arrow keys for navigation in the RDS-Med menu:

- ENTER THE MENU by pressing the Select key.
- SCROLL IN THE MENU using the up and down arrow keys.
- MOVE INTO A MENU SECTION by pressing the Select key or the right arrow key.
- SAVE A VALUE, SELECT A FUNCTION, RESET A COUNTER by pressing the Select key.
- RETURN TO A HIGHER LEVEL in the menu by pressing the left arrow key or wait 15 seconds timeout to return to the Main display.

2.8 KEYPAD DIRECT FUNCTIONS

Keypad direct functions are preprogrammed into the arrow keys. The functions are operational in the Main display. Inside the menu the keys are reserved for navigation.

Activate a direct function in the Main display by pressing the corresponding arrow key. The factory set direct functions of the RDS-Med are shown in the below table.

	Switch backlight on or off
	Mute/Unmute chirp and key buzzer. In warning condition, acknowledges Audio, vibration, and LED signal.
DOSE	Check accumulated dose.
...	User settable function key (with CSW-Med software). Default: no function.

2.9 CONNECTING EXTERNAL PROBES

External probes can be quickly and easily connected to the RDS-Med.

To connect the external probe to the meter, first remove the rubber protection cap of the connector by pulling the cap out. Before making the connection to RDS-Med, make sure the cable is well connected to the probe. The last step is to connect cable to meter. This order ensures, that the meter does not start to recognize probe type before it can be done.

Observe the correct orientation by matching the internal ledge of the connector to the groove on the meter connector. This step is very important to avoid bending the connector pins. Finally, turn the fixing sleeve clockwise until it is firmly fastened.



Most probes are detected automatically. The display will show CSP.INIT or the symbol ⌚ while the connection is being established. For probes with an internal memory (CSP probes, GMP-25, and GMP-12 series except for GMP-12SD) the radiation detection starts without any need for additional input. For a probe without internal memory (GMP-12SD) the meter will prompt to select a detector type before measurement begins. For detailed probe settings by probe type, see Chapter 3.10 External Probes.

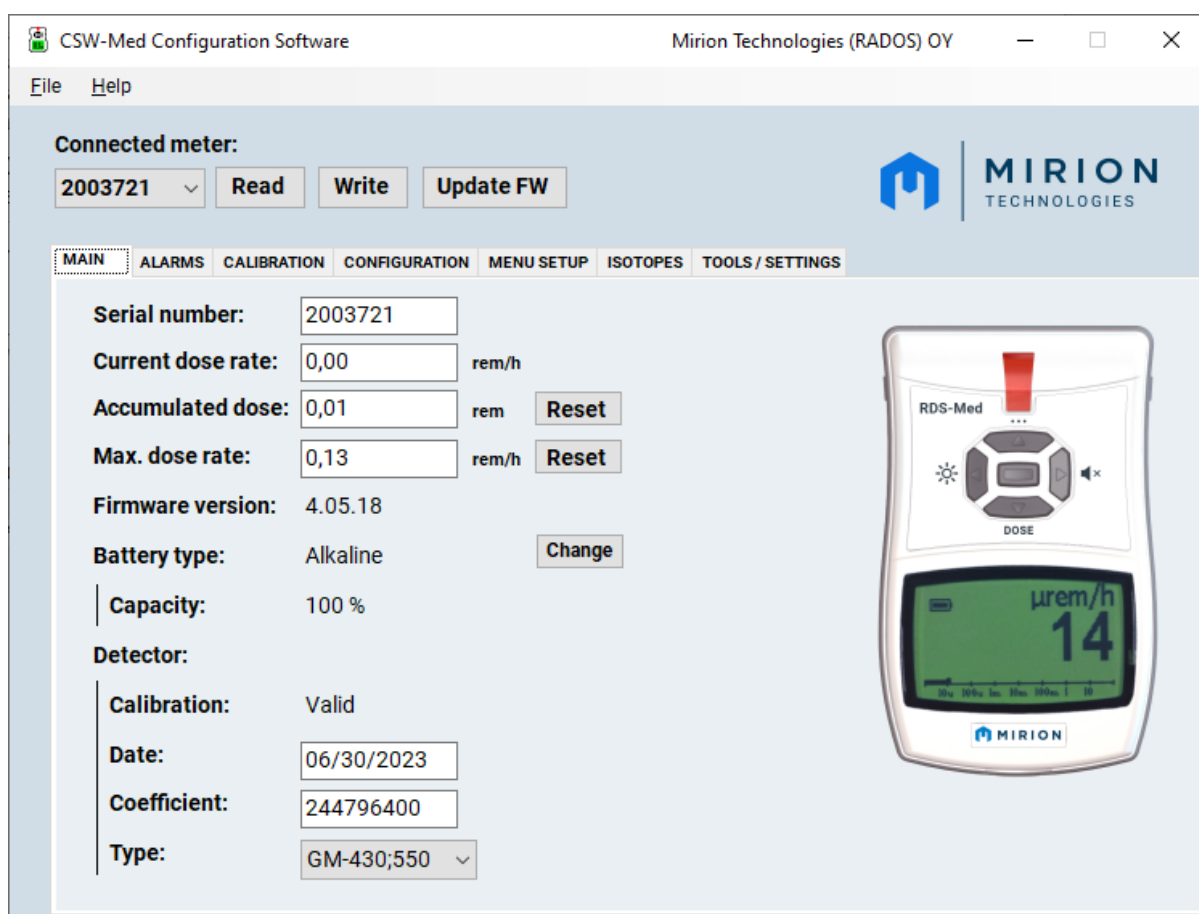


With CSP probes we recommend to always turn the meter off when connecting the probe to ensure correct identification and parameter reading. With the wide selection of CSP probes you must observe that correct probe type is recognized when you switch between different types; re-starting the meter is the safest practice.

2.10 PARAMETER SETTINGS

The parameters of the device can be changed using the menu functions described later in this manual. The CSW-Med Configuration software can be used to simplify the operation or limit access to some parameter settings, like alarm levels. By default, all the menu functions available are visible in the RDS-Med meter.

The CSW-Med Configuration Software offers some additional settings to functions available on the meter itself. For example, the backlight can be set as continuously on in the software. Also, the alarm methods (LED, audio and vibration) in use can be selected in the software. See the CSW-Med configuration software manual for details.



Main Window of the CSW-Med Configuration Software.

3 FUNCTIONALITY

A quick guide to the menu items is provided below. For detailed operation, see the individual chapters for each item.



The lightbulb symbol will appear from time to time in this user manual to indicate a helpful tip for the user.

MENU ITEM	FUNCTION
OFF	Switch off the meter.
DOSE	Check and reset the current accumulated dose value.
MaxDR	Check and reset the current maximum recorded dose rate since last reset.
CHIRP	Switch ON/OFF the visual and audible pulse indication.
ALARM	Set dose and dose rate alarm levels and choose the alarm mode: single, dual or off
EXT.AL	Shown only if an external probe is connected: Check and change the external probe alarm levels.
DIAG	Activate the internal diagnostics, check software revision and battery capacity. Perform calibration check.
DISP	Activate source finder.
COMM	Net WRM connection settings, BLE*
SCALER	Set an integration time/count, acquire current background, and start net or gross acquisition over time.
PROBE	Shown only if an external probe is connected: Check and change the probe settings such as probe type or measurement unit.

*The Net WRM settings are used when the RDS-Med data is being sent over local area network or as serial communication. The device has additionally BLE readiness.

3.1 POWER OFF

The meter is powered off by first pressing the Select key so that the OFF selection is activated, then pressing the Select key again and holding for four seconds while the counter counts down.

If the Select key is released before the four second countdown and following beep, the meter will not power off. Instead, it will return to the menu display OFF.



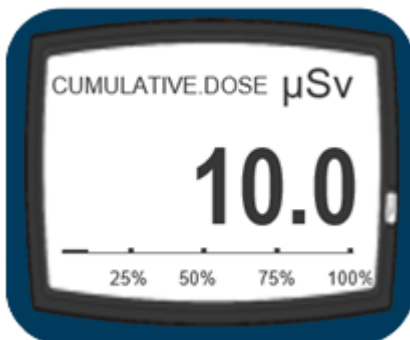
When powered off, the instrument does not completely shut down all the internal circuitries. The RTC-circuit remains active maintaining the time signal. The energy is supplied with the batteries. The time setting of the instrument RTC is lost in case the batteries are removed for more than 3 hours. The time can be reset using the CSW-Med Configuration Software.



In case the instrument is to be stored for a prolonged period, it is advisable to remove alkaline batteries to prevent any leakage to the battery compartment.

3.2 CUMULATIVE DOSE

The meter integrates the cumulative dose continuously when switched on. The cumulative dose can be viewed by pressing the DOSE key in the Main display or by entering the menu and navigating to DOSE.



Example of the Cumulative dose display accessible via the DOSE key in the Main display. The display features a percentage scale which indicates the accumulated dose percentage with respect to the dose alarm level setting.

To reset the accumulated dose, navigate to DOSE in the menu, press the Select key once so that the RESET function starts to blink. Press the Select key a second time to see the confirmation phase SURE? Then press the Select key a second time to perform the reset.

Cancel the dose reset process by pressing the left arrow key.



The RDS-Med collects dose continuously while switched on and saves that value in the meter memory even if the meter is switched off/on. To follow accumulated dose by task or mission, reset the dose as indicated above.



Use the DOSE key to quickly check accumulated dose from the Main display.

3.3 MAXIMUM DOSE RATE RECORD

The meter monitors maximum dose rate while measuring. The maximum recorded dose rate can be viewed by entering the menu.

To reset the maximum recorded dose rate, navigate to MaxDR in the menu, press the Select key once so that the RESET function starts to blink. Press the Select key a second time to see the confirmation phase SURE? Then press the Select key a second time to perform the reset.

Cancel the maximum recorded dose reset process by pressing the left arrow key.



The RDS-Med records the measured maximum dose rate while switched on and saves that measured value even when the meter is switched off/on. To follow the maximum dose rate by task or mission, reset the record as indicated above.

3.4 CHIRP FUNCTION

The chirp function can be used to activate or deactivate the audible or visual chirp. The audible and visual chirp can be disabled individually.

Navigate to CHIRP in menu. The menu shows AUD:ON or AUD:OFF depending on the current state of the audible chirp and LED:ON or LED:OFF depending on the current state of the visual chirp. Change the settings by navigating into the AUD and/or LED menu.



Use the right arrow key in the Main display to mute or unmute the audible chirp and key sounds.

3.5 ALARM FUNCTIONS

The RDS-Med features versatile alarm functions for dose rate and dose which can be set in the ALARM menu.

- Dose Rate indicates the current dose rate alarm level
- Dose Mode indicates the current dose alarm mode: single, dual or off
- Dose indicates the current dose alarm level
- DR Mode indicates the current dose rate alarm mode: single, dual or off

The alarm mode setting allows the user to select the desired alarm functionality. The user can select to apply a single alarm level only, a dual alarm with an additional warning level or switch the alarm completely off. The default mode is single alarm where only one alarm level is in use. The factory set alarm level is 50 $\mu\text{Sv/h}$ for dose rate and 500 μSv for accumulated dose. If the dual mode is taken into use, the factory preset warning levels are 10 $\mu\text{Sv/h}$ for dose rate and 100 μSv for accumulated dose. The alarm levels can be freely set by navigating further into the menu of each setting as described in the coming chapters.

By default, the activation of an alarm state will activate the audible alarm, the visual alarm (LED) and the vibration alarm. An active warning can be silenced in the Main menu by pressing the right arrow key. This will stop the audible alarm, the vibration and the visual (LED) alarm. If an active warning has been silenced, the display will still indicate the warning condition. The alarm methods which are in use can be changed from the CSW-Med Configuration Software.

3.5.1 DOSE RATE ALARM

The dose rate alarm can have three different modes:

- Single
- Dual (different level is set for WARNING and ALARM)
- OFF

To switch between the different alarm modes, navigate to DR Mode and set the desired mode Dual, Single or OFF by pressing the Select key.

To set a new dose rate alarm level, navigate into Dose Rate and set a value by pressing the up/down arrow keys and then moving right (or left) between the numbers to complete your desired setting. When the alarm level has been entered, save by pressing the Select key.



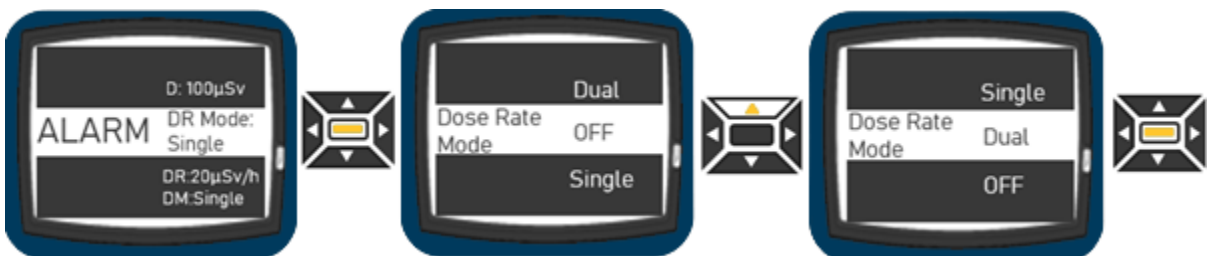
To set the desired alarm level it may be necessary to switch between unit multipliers. To switch between $\mu\text{Sv/h}$, mSv/h or Sv/h , navigate to the unit (furthest right on the display) and change the selected unit multiplier with the up/down arrow keys. When the desired alarm level is selected, save by pressing the Select key.



To ignore the changes, press the left arrow key until the display returns to the previous menu level. Also waiting 12 seconds time out will switch the display back to Main display without changing the alarm level.

In dual mode the user can set two levels which will trigger the device alarming functions: a warning level and an alarm level.

To set the device in dual mode navigate into DR Mode and select Dual from the menu. To set a dose rate warning and alarm navigate into Dose Rate. The first available setting will be Dose Rate Warning. Set a suitable level, lower than the intended alarm level, according to the process described above. Save the desired level by pressing the Select key. The setting will move automatically to Dose Rate Alarm. Set a suitable dose rate alarm according to the process described above.





If the dose rate warning is muted from the Main display, the warning audible, vibration and LED indication will switch off. The display will still continuously show the warning symbol in the left upper corner and the display will blink.



During a dose rate warning the Main display will blink, showing the measured dose rate. The W symbol remains constantly on screen.



During a dose rate alarm the Main display will blink, showing the measured dose rate. The AL symbol remains constantly on screen.



The configuration software offers additional control over the alarm methods. In the software the alarm method can be set freely to any single mode or a combination of audio/visual/vibration.



Use the dual alarm mode to set a dose rate warning level to alert the user to a rising dose rate field which requires attention. The user is then alerted to the unusual condition and the meter will next alert the user if the alarm level is exceeded.

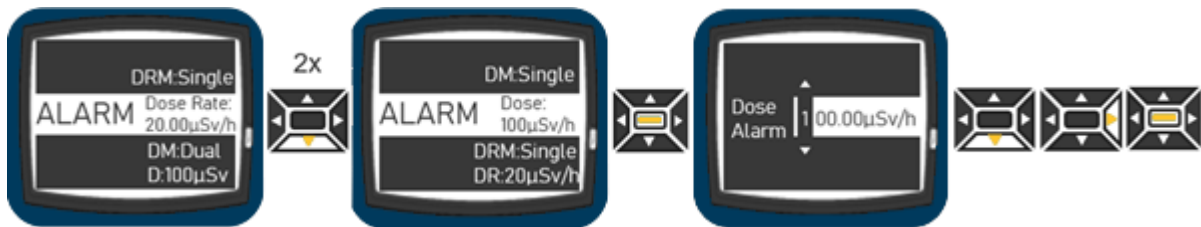
3.5.2 DOSE ALARM

The dose alarm can have three different modes:

- Single
- Dual (different level is set for WARNING and ALARM)
- OFF

To switch between the different alarm modes, navigate to Dose Mode and set the desired mode Dual, Single or OFF by pressing the Select key.

To set a new dose alarm level, navigate into Dose and set a value by pressing the up/down arrow keys and then moving right (or left) between the numbers to complete your desired setting. When the alarm level has been entered, save by pressing the Select key.



To set the desired alarm level, it may be necessary to switch between unit multipliers. To switch between μSv , mSv or Sv , navigate to the unit (furthest right on the display) and change the selected unit multiplier with the up/down arrow keys. When the desired alarm level is selected, save by pressing the Select key.

To ignore the changes, press the left arrow key until the display returns to the previous menu level. Also waiting 12 seconds time out will switch the display back to Main display without changing the alarm level.

In Dual mode the user can set two levels which will trigger the device alarming functions: a warning level and an alarm level.

To set the device in dual mode navigate into Dose Mode and select Dual from the menu. To set a dose warning and alarm navigate into Dose. The first available setting will be Dose Warning. Set a suitable level, lower than the intended alarm level, according to the process described above. Save the desired level by pressing the Select key. The setting will move automatically to Dose Alarm. Set a suitable dose alarm according to the process described above.

If the dose warning is muted from the Main display, the warning audible, vibration and LED indication will switch off. The display will still continuously show the warning symbol in the left upper corner and the display will periodically indicate the dose warning level and the text 'warning'.



During a dose warning the dose warning level will cycle on the Main display with the measured dose rate. The W symbol remains constantly on screen.



During a dose alarm the dose alarm level will cycle on the Main display with the measured dose rate. The AL symbol remains constantly on screen.



The configuration software offers additional control over the alarm methods. In the software the alarm method can be set freely to any single mode or a combination of audio/visual/vibration.



Use the Dual alarm mode to set an accumulated dose warning level to alert the user to an increasing dose. The meter will next alert the user if the accumulated dose alarm level is exceeded.

3.5.3 EXTERNAL ALARM

When an external probe is connected to the RDS-Med, the probe alarm setting can be checked and changed in the EXT.AL meter menu. The external alarms available in the menu are dependent on the connected probe. The external alarm is enabled by default.

For CSP series probes (product codes NOM*) the available alarm types and levels come from the probe memory. These vary with probe type, check the probe manual for details. The preset alarm levels for the CSP probes can be changed using the CSPA software.

For the GMP-12 dose rate probe series, the user can choose any of the preset 8 dose rate alarm levels listed below.

Preset levels for GMP12 series dose rate alarm:

- OFF, 10, 50, 100, 500, 1 000, 5 000, 10 000 or 50 000 $\mu\text{Sv/h}$ or mrem/h .

For contamination probes such as GMP-25 the preset units of the external alarm depend on the unit selected in the Probe menu: cps, cpm, dpm, Bq or Bq/cm2.

- CPS: OFF, 10, 15, 20, 60, 100, 60, 1000 or 6000 cps.
- CPM: OFF, 600, 900, 1200, 3600, 6000 cpm, 36 kcpm, 60 kcpm or 360 kcpm
- DPM: OFF, 1200, 1800, 2400, 7200 dpm, 12 kdpm, 72 kdpm, 120 kdpm or 720 kdpm
- Bq: 20, 30, 40, 120, 200, 1200, 2000 Bq or 12kbq
- Bq/cm2: list will be Bq values divided by detector area

Set the probe alarm level by navigating into the EXT.AL menu and pressing the up/down arrow keys until the desired alarm level is the active selection. Press the Select key to save the desired alarm level.



Navigate into the Probe menu to change the probe measuring unit, if necessary. See Chapter 3.10 External Probes for more details.

3.6 DIAGNOSTICS

The Diagnostics menu has the following features (described in following chapters):

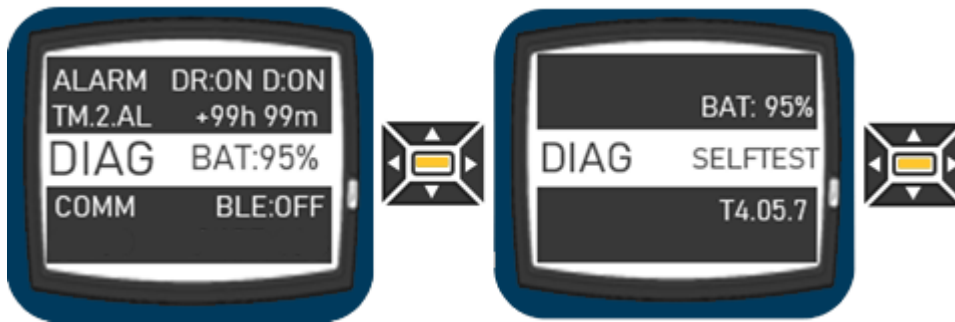
- DISPLAY THE DEVICE FIRMWARE VERSION
- MANUAL ACTIVATION OF THE METER SELFTEST
- DISPLAY THE BATTERY CAPACITY LEVEL
- PERFORM CALIBRATION CHECK

3.6.1 FIRMWARE VERSION

The device firmware can be updated using the CSW-Med Configuration Software. See the software manual for more details.

3.6.2 SELF TEST ROUTINE

To activate the meter selftest routine, navigate into the DIAG menu, the selftest is the active selection and press the Select key to initiate.



The selftest routine includes checking the high voltage, the operating voltage, and the battery capacity. During this process the user may also check the operation of all the display pixels, the visual alarm LED, the audible alarm, and the vibration alarm.



When using NiMH batteries, set the correct battery type in the CSW-Med configuration software. Note that with NiMH batteries the battery capacity indication is less accurate than for alkaline batteries.

3.6.3 CALIBRATION CHECK

Calibration check is available under Diagnostics, the default procedure listed below.

- Calibration check expects to have 1 mSv/h (default) @ CS-137 field and checks that the response is within $\pm 10\%$.
- After starting the calibration check, the device shall be placed to 1mSv/h field in 30 seconds.
- Calibration check expects to detect 10000 pulses within 5 minutes. Calibration check ends after the needed pulses are detected.
- Calibration error is displayed if detected dose rate is not within $\pm 10\%$.

If the Calibration check is selected by mistake, wait approximately 5 minutes for the routine to finish (CALIB.CHK, Calibration in progress). The meter will display Calibration error. Press any button to exit the mode. The meter will restart, no changes or checks made.



The RDS-Med has a fixed calibration validity of 365 days. Performing a successful calibration check from the DIAG menu will prolong the validity by another 365 days. The prolonging is possible for up to 3 years, after which a full calibration is needed.

3.7 DISPLAY

You can turn the source finder mode ON and OFF from the Display menu. The source finder turns the Main display into a visual histogram to guide the user to find contamination and radiation sources. The source finder is deactivated in the event of an alarm.

3.8 COMMUNICATION

3.8.1 NET WRM


The WRM functionality is used to send data packets via external data connection, for example serial line or Local Area Network. The WRM can be set to OFF or to send messages in intervals between two seconds to one hour.

To activate the Net WRM communication in RDS-Med (or set data send interval in RS communication or over Local Area Network):

Navigate into the WRM menu and select a suitable send interval from the available options: 2 s, 4 s, 10 s, 20 s, 30 s, 60 s, 5 min, 10 min, 15 min, 30 min and 60 min.

Change the state to OFF to deactivate the WRM communication.



If the WRM is activated the Main display will show the symbol .


3.8.2 BLE

The device has readiness for Bluetooth communication. Contact Mirion for additional information.

BLE communication can be configured in the BLE menu. The user can manually activate BLE enumeration for 60 s. The user can also disable BLE communication in this menu.

- ON will activate BLE enumeration for 60 seconds
- OFF will disable the BLE communication



If the BLE is activated the Main display will show the symbol  .

3.9 SCALER

The Scaler functionality allows the user to set a measurement integration time and to measure the current background. This enables net measurements. The scaler function can be used to improve the measurement MDA (Minimum Detectable Activity).

When an external probe is connected, the scaler functionality is reserved for the external probe.

The following chapters describe the scaler functionality for the RDS-Med internal detector or an external dose rate probe and other external probes.

3.9.1 SCALER FUNCTION INTERNAL DETECTOR/DOSE RATE PROBE

The Scaler menu of the RDS-Med internal detector or an external dose rate probe has the following features:

- Settings
- Gross Meas.

The settings menu allows the user to set an integration time:

10 s, 1 min, 3 min, 6min, 10 min, 30 min and 60 min.

When the desired integration time has been set, the user can then select to perform a Gross measurement.

Initiate a scaler measurement by navigating into Gross Meas. and selecting start. The measurement result remains on the meter display until the Select key is pressed for a new acquisition or the left arrow key is pressed to exit the mode.

Once a scaler measurement has been initiated it can be stopped at any time by pressing the Select key or the left arrow key. In that menu the measurement can be restarted, stopped or aborted. If the scaler measurement is stopped, the result of the measurement will be displayed. If the scaler measurement is aborted, the display will move to the Scaler menu without showing a result.



The result of a Scaler measurement with RDS-Med internal detector or with an external dose rate probe will show the dose R (P) and the time T.

3.9.2 SCALER FUNCTION WITH OTHER EXTERNAL PROBES

With an external probe connected, the Scaler menu has the following features:

- Settings
- Gross Meas.
- Background
- Net Meas.

The Settings menu allows the user to change the probe unit and to set a measurement integration time or number of counts. The preset time/count levels being:

10 s, 1 min, 3 min, 6 min, 10 min, 30 min and 60 min or 100, 1000, 10000, 20000 counts.

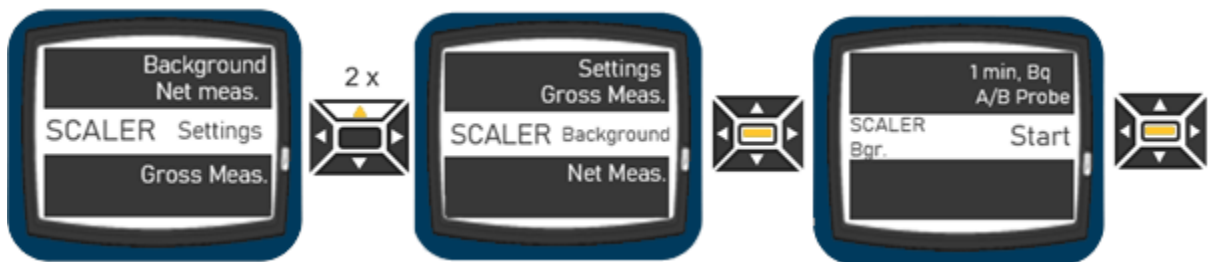
The options available in the scaler menu will depend on probe type. For example, for the GMP-25 probe there is a time setting available instead of time/count and the scaler menu will show the current isotope in use.

The following menu views are for a SAB-100 probe:

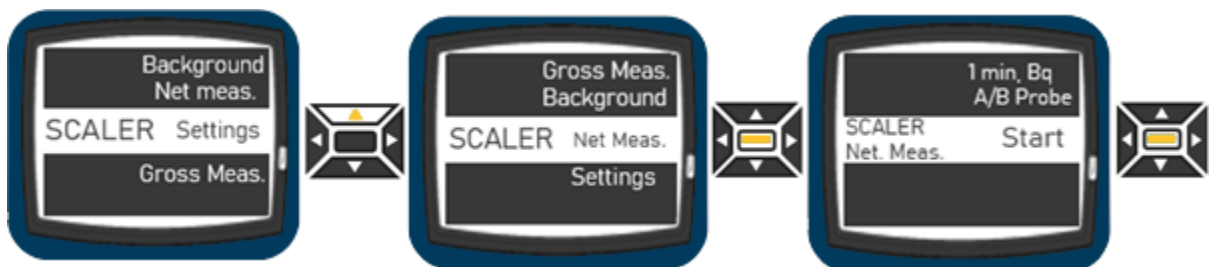


When the desired settings have been entered, the user can then select to perform a Gross measurement by navigating into Gross Meas. and selecting start.

In a Net measurement the background is reduced from the measured counts. Before initiating a Net measurement, acquire the Background by navigating into the Background menu and selecting start.

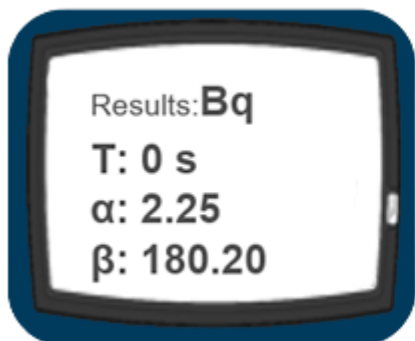


When the background measurement is finished, pressing the Select key will take to the Net measurement menu. This menu view will also show the current background measurement results. Initiate a Net measurement by selecting start.

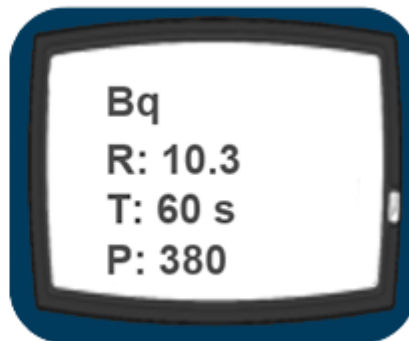


A scaler measurement result remains on the meter display until the select key is pressed for a new acquisition or the left arrow key is pressed to exit the mode. If the Net Meas. result is less than background it will be empty.

Once a scaler measurement has been initiated it can be stopped at any time by pressing the Select key or the left arrow key. In that menu the measurement can be restarted, stopped or aborted. If the scaler measurement is stopped, the result of the measurement will be displayed. If the scaler measurement is aborted, the display will move to the Scaler menu without showing a result.



Example result of a Scaler measurement with an external alpha/beta probe showing time T and the result alpha and beta activity.




Example result of a Scaler measurement with an external alpha/beta/ gamma pancake probe showing the result activity R in Bq, count time T and counted pulses P.

3.10 EXTERNAL PROBES

External probes can be quickly and easily connected to the RDS-Med.

To connect the external probe to the meter, first remove the rubber protection cap of the connector by pulling the cap out. Before making the connection to RDS-Med, make sure the cable is well connected to the probe. The last step is to connect cable to meter. This order ensures, that the meter does not start to recognize probe type before it can be done.

Observe the correct orientation by matching the internal ledge of the connector to the groove on the meter connector. This step is very important to avoid bending the connector pins. Finally, turn the fixing sleeve clockwise until it is firmly fastened.

Most probes are detected automatically. The display will show CSP.INIT or the symbol  while the connection is being established. For probes with an internal memory the radiation detection starts without any need for additional input. For the few probes without internal memory the meter will prompt to select a detector type before measurement begins. See the below chapters for detailed instruction by probe series: CSP series, GMP-25/GMP-12 and probes without internal memory.

The Probe menu is visible only when an external probe is connected. The probe menu features items depending on the connected probe type.

3.10.1 CSP (CANBERRA SMART PROBE) SERIES

The CSP series extends the RDS-Med capabilities with a large array of versatile probes. See Chapter 7.2 for a probe listing. With CSP probes use of lithium batteries is recommended.

With CSP probes we recommend to always turn the meter off when connecting the probe to ensure correct identification and parameter reading. With the wide selection of CSP probes you must observe that correct probe type is recognized when you switch between different types; re-starting the meter is the safest practice.

The CSP probes (part nos beginning with NOM*) have an internal memory and are automatically recognized by the RDS-Med. The probe menu with CSP probe connected features:

- PROBE TYPE
- PROBE UNIT

The units which are available will depend on the probe type. See the probe manual for more details. If the probe unit is changed in the RDS-Med menu, it will be saved into the probe memory.

To see the isotope coefficients, use the CSPS software or check the probe documentation, if the factory calibration and isotope settings have not been changed. The isotope coefficients can be changed in the CSPS software.

3.10.2 OTHER PROBES WITH INTERNAL MEMORY

GMP-25 is a contamination probe with internal memory. When these probes are connected to the meter, they are automatically recognized. The probe menu features will depend on the probe type. For example, when a GMP-25 is connected to the meter, the Probe menu features:

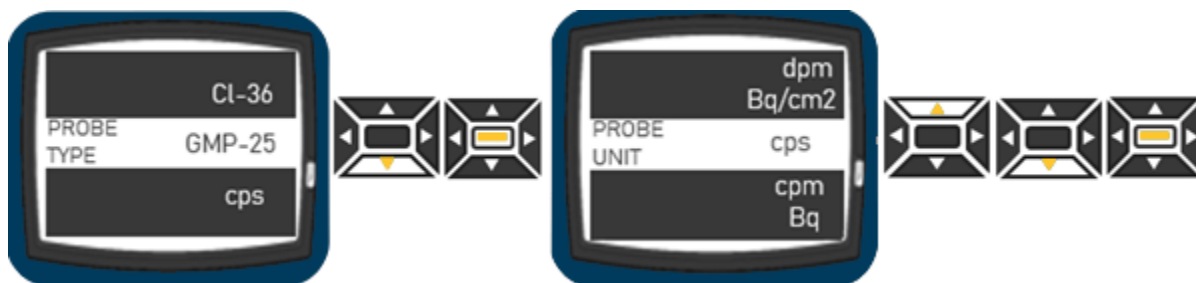
- PROBE TYPE
- PROBE UNIT
- PROBE Isotope

The GMP-12 probes are a series of dose rate probes with internal memory (except GMP-12SD). These probes have an internal memory and will be automatically recognized. However, they don't have any settings which could be in the Probe menu, so the menu will not be visible.

The following menu examples are with the GMP-25 pancake probe connected to the RDS-Med.



The Probe Unit menu shows the probe measurement unit which is currently in use and allows the user to change the unit. For the GMP-25 probe the available units are cps, cpm, dpm, Bq and Bq/cm2. To change the measurement unit, navigate into the Probe Unit menu and select from the list. Note that when selecting Bq or Bq/cm2, the conversion from counts to Becquerels will be made using the isotope coefficient introduced in the next paragraph.



The Probe Isotope menu shows the name of the current isotope coefficient in use. To view the actual numerical coefficient or to change the isotope settings, use the CSW-Med software.

The RDS-Med reads data from the probe memory such as the unit of measurement and the saved isotopes. For example, the default unit in the GMP-25 is cpm. Even if the unit is changed from the meter menu, at the next power on the cpm unit will be read again from the probe memory.

3.10.3 PROBES WITHOUT INTERNAL MEMORY

The RDS-Med is compatible with some probes which don't have internal memory, the most common being the GMP-12SD dose rate probe with high dose endurance.

When connecting a probe with no memory, the user will be prompted first to select the probe type. There are three types:

- Gen.CHK.Def is for a probe with no internal memory that is tested for the pulse generation of the external probe. If no pulses are detected for a given time, the meter will show an error message. Select this type only when using legacy probes such as GMP-11-3 or GMP-15-3.
- Gen.No.Def is for a probe with no internal memory that is not tested for pulse generation. For example, probes which are alpha sensitive only, and there are no pulses at all in the determined time window.
- GMP-12SD is dedicated to the GMP-12SD dose rate probe. When using this probe type, select first the probe type and then the probe serial number to use the correct probe calibration coefficients. If the serial number is not selected, probe type default coefficients will be used. If the serial number is not available, the probe calibration coefficients have not been saved into the RDS-Med memory. The CSW-Med Configuration software is required to do that. See the software manual for instructions on how to save the probe coefficients.

The probe type can be changed without switching the meter off, by navigating into the PROBE menu and selecting another type. Selecting the wrong probe type may lead to an error condition Det.DFE accompanied by an audible alarm, as the pulses from the probe don't match to the expectation and the meter detects a detector fault. In this case, switch the meter off and select another probe type at start up.



The RDS-Med meter will remember the last selected probe type without internal memory. When connecting a probe without memory, if the user doesn't make a selection in the menu when prompted, the RDS-Med will use the type selected last which will be blinking in the display.

4 ERROR CODES AND OTHER DISPLAY MESSAGES

When necessary, the meter will give display messages regarding battery condition, current alarms, warnings, and error situations.

4.1 LOW BATTERY WARNING

An audible low battery warning signal combined with a blinking battery symbol indication repeated every 6 minutes when the battery capacity is $10\% < \text{Capacity} < 30\%$

Low battery warning: ——— - ——— (Long – Short – Long Bleep in five minutes intervals). The dose rate measurement continues normally.

4.2 LOW BATTERY ALARM

The display shows "LOBAT" blinking and the audible alarm is activated when the battery capacity is $< 10\%$.

Low battery alarm: ——— - ——— (Long – Short – Long Bleep in 20 second intervals).

NOTE: The dose rate measurement is prevented.

4.3 DOSE RATE / DOSE WARNING (BLINKING DISPLAY)

Dose rate warning: ----- (two beeps per second).

The dose rate display is blinking, and the continuous audible alarm is on. The alarm can be silenced with right arrow key in the Main display.

Dose alarm: - - - - - (one beep per two seconds).

The dose rate display is on and the current dose warning level alternates in the display and the continuous audible alarm is on. The alarm can be silenced with the right arrow key in the Main display.

4.4 DOSE RATE / DOSE ALARM (BLINKING DISPLAY)

Dose rate alarm: ----- (two beeps per second).

The dose rate display is blinking, and the continuous audible alarm is on.

Dose alarm: - - - - - (one beep per two seconds).

The dose rate display is on and the current dose alarm level alternates in the display and the continuous audible alarm is on.

4.5 DOSE RATE OVERFLOW ALARM (OFL)

When the measurement limits are exceeded, the display shows “OFL” (blinking). The continuous audible alarm is on.

Dose rate overflow: — (continuous beeps).

The overflow alarm cannot be reset.

NOTE: When the dose rate overflow has been activated, there will be a message from this event in the dose read-out. When the dose is given, the display alternates between “DR.OFL” <-> dose. This flag will be set when the dose is reset. This is to inform the user that the measured dose might not give the true value due to exceeding the maximum measurable dose.

4.6 DEFECT ERRORS

In case there is a critical internal failure in the instrument, the Defect error is activated. The continuous audible alarm is on.

Error alarm: — (continuous beeps every two seconds).

The dose rate measurement is prevented.

Error codes and types:

CAL.DF Calibration error, the calibration coefficient is default, or is out of accepted limits.

FLS.DF Non-volatile memory error

DET.DF Internal detector is faulty

DET.DFE External detector is faulty

DG1.DF High voltage is not within specified range

DG2.DF Internal power supply is out of specified range

DG3.DF Firmware CRC error; the bit sum check of embedded software failed

LFE.DF Cumulative dose overflow (>10 Sv). The GM-detector can be at the end of life.

Should an error occur, write down the Error message and return the meter to the manufacturer for service (for contact info: see the last page of this manual). The internal diagnostics memory will also store critical errors, but in case the problem is the memory itself, it cannot be completed.

5 MAINTENANCE AND DECONTAMINATION

No specific maintenance is required except for a periodic check of the calibration. Calibration check is described in Chapter 3.6 Diagnostics.



A simple functional check of the meter can include switching it on and letting it run through the self-check routine at start up. Leave the meter on additionally for several minutes to check that the detector receives pulses as expected even at background level or use a small radiation source to check that the meter responds.

5.1 FIRMWARE UPDATE

The CSW-Med Configuration Software is needed to perform a firmware update. Follow the procedures outlined in the software manual to upload a new firmware to the RDS-Med.

The latest RDS-Med firmware can be downloaded from mirion.com

Note! If the RDS-Med becomes unresponsive during a firmware update, don't remove the batteries, simply try to run the firmware update again.

5.2 BATTERY COVER AND SEAL CHANGE

For battery cover and seal change a replacement cover or seal and a Pozidriv #1 screwdriver are needed.

Instructions:

- Unscrew the battery cover from the meter
- Pull the rubber seal from the plastic cover.
- Attach the new rubber seal to the plastic cover.
- Make sure that the tips in the plastic are in the holes of the seal and the seal is well aligned.
- Screw the battery cover back to the meter.

5.3 CALIBRATION

The CSW-Med Configuration Software is needed for the calibration of RDS-Med. Follow the calibration procedure outlined in the software manual. A calibration check can be activated directly from the meter menu under DIAG.

5.4 MECHANICAL DECONTAMINATION

The recommended mechanical method for decontamination is vacuum cleaning or blasting with pressurized air.

5.5 CHEMICAL DECONTAMINATION

During the decontamination procedure following items are needed:

- Cleaning solution with neutral pH (non-corrosive preferred)
- Cotton pad, paper tissue, etc.

The RDS-Med can be decontaminated with any commercially available decontamination solutions which are suitable for polycarbonate/polyamide materials (e.g. Sprint 200 Free PH 7). Acetone is not recommended. Begin with wiping and/or brushing. Immersion is only recommended as a next step if necessary and after it has been confirmed that the IP67 sealing of the meter is intact. Please see the service manual or ask the manufacturer for more advice about immersing the RDS-Med in a decontamination solution.

6 SPECIFICATIONS

Complies with IEC 60846-1 standard, designed to meet ANSI 42.17A, 42.17C standards. The device is CE and UKCA compliant.

RADIOLOGICAL CHARACTERISTICS

- Radiation detected gamma and X-rays. Alpha, beta, and neutron radiation with external probes
- Operational quantity: ambient dose equivalent H(10)
- Geiger-Mueller (GM) radiation detector with the possibility of measuring natural background levels
- IEC Energy Range: 48 keV to 1.8 MeV
- Dose Rate Measurement Range: 0.05 $\mu\text{Sv/h}$ to 100 mSv/h (5 $\mu\text{rem/h}$ to 10 rem/h)
- IEC Dose Rate Measurement Range: 0.3 $\mu\text{Sv/h}$ to 100 mSv/h (0.03 mrem/h to 10 rem/h)
- Dose Measurement Range: 1 μSv to 10 Sv (0.01 mrem to 1000 rem)
- Dose Rate Linearity: -15% to +22% 0.3 $\mu\text{Sv/h}$ to 0.1 Sv/h (0.03 mrem/h to 10 rem/h)

FUNCTIONAL CHARACTERISTICS

- Four navigation keys and a select key to operate the instrument
- Three keypad direct functions: Backlight, Mute and Dose and one user-defined shortcut
- Direct access to dose screen from keypad: level of dose in percentage of alarm level
- Configurable units: Sv(/h), rem(/h), with external detectors cps, cpm, dpm, Bq and Bq/cm²
- Audible, visual and vibration alarm with configurable levels
- Real-Time Clock (RTC) function with 3 hrs battery back up
- Graphical LCD display; special symbols for alarm, external probe, battery, communication, vibration alarm, chirp and mute
- Dual display in probe mode; measurements from internal and external detector simultaneously
- Scaler/time with gross or net measurement (background deduction) for improved statistics

ELECTRICAL CHARACTERISTICS

- Power supply: Batteries 2 x AA/LR6, alkaline, NiMH or lithium
- Operation time with fresh Alkaline batteries more than 2 months 8h use/24 h (600 h in background radiation, Bluetooth® Low Energy disabled, 1 display backlight off, LED off)
- Operation time with fully charged NiMH batteries more than 1.5 months 8 h use/24 h with 2900 mAh capacity (in background radiation, Bluetooth Low Energy disabled, display backlight off, LED off)
- Contacts for external power and charging of NiMH battery
- Alarm audio level 86 dBA at 30 cm

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature: -25 °C to +60 °C (-13 °F to 140 °F)
- Storage temperature -40 °C to +70 °C (-40 °F to 158 °F)
- Relative humidity 10% to 95% at +35 °C (95 °F)
- RF-immunity: Fulfills following standards: IEC 61000-4-2 (2008), IEC 61000-4-3 (2006 +A1:2007 + A2:2010), IEC 61000-4-6 (2013), IEC 61000-4-8 (2009)
- RF Emissions: Fulfills following standards: EN 55032B
- FCC approval 2AHI8-RDS-32
- IC Approval 26167-RDS32
- IEC 60846-1

MECHANICAL CHARACTERISTICS

- Case: high impact durable glass fiber reinforced polymer; drop tested from 1 m height on concrete floor on each side
- Ergonomic design, rubber grip around the case
- Binder-702 series connector
- Enclosure class IP67 (IEC 60529), including battery compartment
- Dimensions: 116 x 72 x 32 mm (4.57 x 2.83 x 1.26 in)
- Weight without batteries/with batteries: 160 g / 210 g (0.35 lb/0.46 lb)
- Wrist strap, battery covers with and without a belt clip

COMMUNICATION PROTOCOLS

- USB communication with suitable adapter
- Bluetooth Low Energy 4.2 protocol, Class 2 communication

RDS-MED VERSIONS AND ORDERING CODES

Part no. 1233-343 RDS-Med S Radiation Survey Meter

Part no. 1233-344 RDS-Med R Radiation Survey Meter

The version with Sievert-units is marked with 'S' and the version with rem-units with 'R'.

7 ACCESSORIES AND PROBES

7.1 ACCESSORIES

PROBE CABLES:

Part no. 1233-293	GMP-12SD/GSD/UW/GMP-25i coiled connection cable, 0,7 m - 1,6 m
Part no. 1233-295	GMP-12SD/GSD/UW/GMP-25i straight connection cable, length 20 m
Part no. 1233-318	RDS-CSP probe adapter cable, length 0,4 m
Part no. 1233-319	RDS-CSP probe straight adapter cable, length 1,5 m
Part no. 1233-320	RDS-CSP probe coiled adapter cable, length 0,7 m - 1,6 m

SOFTWARE:

Part no. 1233-345	CSW-Med Configuration Software incl. Cable Link
Part no. 1233-333	USB-RDS-Med Cable Link

OTHER ACCESSORIES:

Part no. 1233-300	Alarm Box without RDS-Med and accessories
Part no. 1233-301	Alarm Box alert kit: signaling set A (fixed on top)
Part no. 1233-302	Alarm Box alert kit: signaling set B (includes wall mounting)
Part no. 1233-303	LAN Adapter to Alarm Box
Part no. 1233-213	Telescopic Pole for RDS meters (incl. carrying strap)
Part no. 1233-311	Carrying bag for telescopic pole
Part no. NOM006819	RDS/CSP Bracket (to fix RDS meters to CSP probe body, excl. cable)
Part no. 1241-251	Cradle for RDS meters including power supply and wall mounting kit

7.2 COMPATIBLE PROBES GMP/CSP SERIES

Part no. 1233-294	GMP-12GSD Gamma dose rate probe
Part no. 1233-286	GMP-12SD Gamma dose rate probe
Part no. 1233-287	GMP-12UW Gamma dose rate probe
Part no. 1233-279	GMP-25 Alpha/Beta/Gamma pancake probe
Part no. 1233-291	GMP-25i Alpha/Beta/Gamma pancake probe
Part no. NOM006273	SA-100 Alpha CSP probe with 100 cm ² detection area
Part no. NOM006272	SB-100/A Beta CSP probe with 100 cm ² detection area, Mylar window
Part no. NOM006309	SB-100/B Beta CSP probe 100 cm ² detection area, Aluminum window
Part no. NOM006413	SA-32: Alpha CSP probe with 32 cm ² detection area
Part no. NOM006499	SB-32: Beta CSP probe with 32 cm ² detection area
Part no. NOM006514	SAB-32 Alpha/Beta CSP probe with 32 cm ² detection area
Part no. NOM006290	SX-2R 1.5" x 3 mm X-Ray CSP probe
Part no. NOM006274	SAB-100 Alpha/Beta CSP probe with 100 cm ² detection area
Part no. NOM006306	SABG-100 Alpha/Beta/Gamma CSP probe, 100 cm ² detection area
Part no. NOM006554	SAB-250 Alpha/Beta CSP probe with 250 cm ² detection area
Part no. NOM006960	Easy-Count Alfa/Beta PIPS smear holder, belongs to CSP series
Part no. NOM006270	SG-1R 1" x 1" NaI(Tl) Gamma CSP probe
Part no. NOM006271	SG-2R 2" x 2" NaI(Tl) Gamma CSP probe
Part no. NOM006291	SPAB-15 Alpha/Beta 15 cm ² CSP probe with PIPS detector
Part no. NOM006323	STTC Wide Range Gamma CSP probe
Part no. NOM006503	STTC-W Wide Range Gamma CSP probe with 20 meter cable on reel
Part no. NOM006622	TELE-STTC-2/R31 Wide Range Gamma telescopic CSP probe
Part no. NOM006673	TELE-STTC-2L/R31 Wide Range Gamma telescopic CSP probe, ultralight
Part no. NOM006364	SABG-15+ Alpha/Beta/Gamma pancake CSP probe
Part no. NOM006371	SVLD Very Low Dose Rate Gamma CSP probe
Part no. NOM007742	SN-D-2 Neutron Dose Rate CSP probe
Part no. NOM006363	SN-S Neutron Search CSP probe
Part no. NOM007745	SABS-579 Alfa/Beta 579 cm ² Floor CSP probe
Part no. NOM006603	SABP-525 Alfa/Beta 525 cm ² Foot CSP probe

8 FCC COMPLIANCE STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Modifications: Any modifications made to this device that are not approved by Mirion Technologies Oy may void the authority granted to the user by the FCC to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

9 ICC COMPLIANCE STATEMENT

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FEEDBACK

We are continuously working hard at producing correct and easy-to-read technical documents. However, complex systems are often difficult to explain or understand and therefore mistakes or inadequacies may occur occasionally in the documentation process. To correct these errors, we would like to hear your opinion on this document.

You can submit your feedback on our website www.mirion.com filling out the contact form. Alternatively, you can directly contact the manufacturing site for RDS-Med:

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As standards, specifications and design are subject to change over a period of time, please request for the confirmation of the information given in this publication.

For additional information on Mirion products and solutions please visit our webpage www.mirion.com

